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**STRUCTURE BASED
PHYSICIAN REQUIREMENTS STUDY**

by

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North Arlington, Virginia**

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EXECUTIVE SUMMARY

This report responds to a task from the Office of The Surgeon General to analyze combat health service support physician requirements at levels 1 and 2. The primary input for the report was from a review of historical literature and documents and the briefings and analysis provided by a subject matter expert (SME) panel. This panel assembled for the effort and used planning data from the Army Medical Department (AMEDD) Center and School.

Analysis of casualty rates for World War II through Vietnam, as well as the limited rate information available for operations since Vietnam, indicate that there has been a decline in casualty rates for wounded in action, killed in action, non-battle injuries and disease. Review of Tables of Organization and Equipment for the same operations used in the rate analysis leads to the conclusion that the number of Medical Corps officers in the levels 1 & 2 of division medical support have remained relatively constant. World War II had the highest number at forty-three. The range from Korea to the present L-series TOE was thirty-four to thirty-five. The medical structure proposed for Army Force XXI at levels 1 & 2 is thirty-three.

The panel analyzed four alternatives addressing a variable number of Medical Corps officers in the division. Each alternative addressed corresponding risks. They included reducing the number of physicians by 0, 3, 6, or 9. The alternative that received ***unanimous approval***, (the 0 decrease alternative) stated the current number of thirty-three physicians for Army Force XXI should remain. This is a decrease of 2 Medical Corps officers from the present requirements and represents the lowest risk alternative to sustain combat operations.

SECTION 1. INTRODUCTION

1.1 Purpose

The purpose of the study is to provide a response to an OSD (PA&E) question. The Office of the Surgeon General received the PA&E concern about the apparent lack of change to the number of physicians required within the division medical structure since 1970. PA&E alleges that the division levels 1 and 2 physician structure has not changed since World War II.

1.2 General

This report responds to a task from the Office of The Surgeon General to analyze combat health service support physician requirements at levels 1 and 2. The focus of the study is the division level physician structure. Workload factors, such as casualty rates, do not appear to influence that structure. However, the division size, concept of operations, employment, and expected casualties have changed substantially. The OSD (PA&E) question is a result of a Defense Health Program Review Group issue concerning the number of structure based physician requirements in deployable units throughout a theater of operations.

1.3 Methodology

Because of the time available to accomplish the analysis, a large portion of the work centered on the findings of a subject matter expert (SME) panel. This panel assembled for the effort and used planning data provided by the Army Medical Department (AMEDD) Center and School. The panel effort and results were extremely successful. The panel composition was a cross-section of soldier medics, all level 1 and 2 combat health service support experts with a wide variety of experience. (See Annex A, panel membership.) Their focus, motivation, enthusiasm, professionalism, and knowledge complemented the collective synergy of their specialties, officer and NCO, physician and physician assistant, and others. The consensus achieved by the panel, coupled with the historic research effort and the recently completed levels 1 and 2 patient modeling effort, all served to produce the highest degree of confidence in the panel results.

SECTION 2. BACKGROUND

2.1 General

Beginning with the 1980's, the Army Medical Department has been under constant pressure to justify its officer needs, particularly, its physician requirements for dual missions (peace and war). The Wartime Medical Planning study, an OSD-initiated study during the early eighties, was a validation of the Army's system and methodology to determine military medical wartime requirements. Although the focus of the study was at the corps level, it had implications for echelon 1 & 2, and for the CONUS base. The study held that the Army process was valid for determining wartime personnel requirements.

With the end of the cold war and the dismantling of the Soviet Union and its Warsaw Pact forces, the Army has seen its end strength greatly reduced to meet the lower threat threshold and budget reductions imposed by Congress. Today, the Army and the Army Medical Department must again justify its wartime requirements. This study concentrates on Army Force XXI structure. The Army Medical Department has recently agreed to test division level medical forces under the Force XXI concept. The former Deputy Surgeon General, MG Spurgeon Neel, in his 1973 assessment of medical support to the U.S. Army in Vietnam, 1965-1970, stated:

"It was estimated.... that the number of physicians in the division could be reduced from 34 to approximately 12 without impairing the quality of medical care available to the troops.... The utmost reliance upon the helicopter ambulance had virtually eliminated the battalion aid station, and often the division clearing station, from the chain of evacuation when a surgical, evacuation, or field hospital was within the same flying time or distance."

General Neel also stated that *"In contrast to the usual practice in Vietnam of evacuating a casualty from the site of wounding to a hospital by air ambulance, 95% of the casualties in the 1st Cavalry Division (Air-Mobile) were first evacuated to one of the division's clearing stations, because of the size of the division's area of operation. The remaining 5% severely wounded or critically ill patients who could not have survived a stop en route, were evacuated directly to...(a surgical hospital)."*

"Since there was no difference in flying time from the combat area to the helipad of the clearing station of the 15th Medical Battalion (Air-Mobile) and that of the 45th Surgical Hospital at Tay Ninh, patients were evacuated to the clearing station.... The clearing station handled a surprisingly large number of casualties in a short period of time. It also weeded out the slightly wounded and the [minor non-battle injuries and illnesses] who would have become the responsibility of the 45th Surgical Hospital...."

The intensive use of helicopter evacuation in Vietnam cannot be, nor should it be, considered a level of treatment for casualties. Indeed, as General Neel noted in his assessment of evacuation for the 1st Cavalry Division (Air-Mobile), the medical clearing company performed a vital role in separating the slightly wounded and the *minor non-battle injuries and illnesses*.

During World War II and Korea, patients who received medical care for battle wounds that did not require admission to a hospital were "carded for record only" (CRO). The following chart shows the difference between Korea and Vietnam, where excessive evacuation of CROs (sick and injured soldiers) to hospitals for diagnosis and treatment was wasteful.

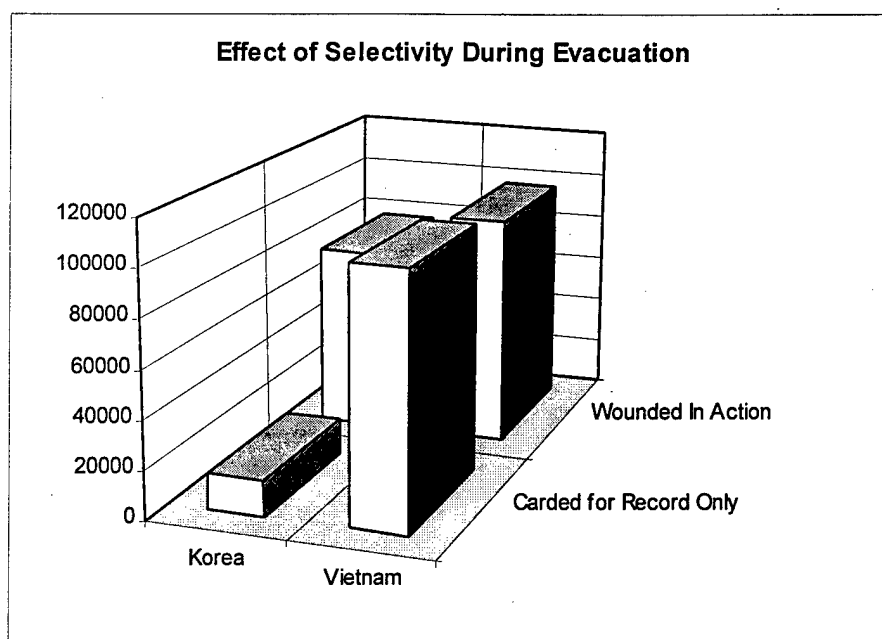


Figure 1. Effect of Selectivity During Evacuation

Although the system of hospitalization and evacuation did not get fully tested during Desert Shield and Desert Storm, the immense size of the combat zone mandated the decentralization of medical assets to sustain combat forces. The Army medical system of echelons for treatment and evacuation was the only tested modality to support the tactical commander. The military medical presence in a theater of operations, together with evacuation for definitive care is a necessity to reduce mortality and morbidity.

2.2 Determining Personnel Requirements

The Army process for determining personnel structure, including physicians, depends upon requirements, documented in tables of organization and equipment (TOE), for the various types of units. The Army then allocates units to the force to support the Army contribution to the national military strategy. Many of the units that require medical personnel are part of the "above the line force." The "above the line" force represents the minimum Army force structure (units organic to the divisions and separate brigades) that must have resources to carry out the strategy. The "above the line force" drives the "below the line force." The "below the line" force structure represents the combat support and combat service support units required to support the combat force. Medical units are usually within the "below the line" force. Typically, those units are: area medical support battalions, hospitals, laboratories, preventive medicine units, evacuation battalions, dental units, combat stress control teams, and command and control units.

The Army's Total Army Analysis (TAA) process focuses on the "below the line force" that can significantly change because of variations in workload, such as troop populations, casualty rates, evacuation policies, operational requirements, threats, or resource assumptions. It is essential to understand "workload" criteria and their influence on physician structure. The Army adjusts units such as hospitals (general, field, combat support hospitals) in numbers and in component (Active Army, Army National Guard, and Army Reserve) during the TAA process. They base the adjustments upon the allocation rules for each type unit. Most allocation rules are workload driven. The population supported is the determinant for some echelon above division (EAD) units. The 1980 OSD sponsored medical structure study validated the Army process for those type units.

Troop population is an indirect workload for medical units; it depends upon computation of the expected disease and non-battle injuries (DNBI) and wounded in action (WIA) patients occurring within that population. The process of adjusting allocation rules is integral to the TAA process.

The only physician requirements not directly influenced by "workload" are those physicians within the division, separate brigades, and armored cavalry regiments, which are in the "above the line" combat forces. Although this "workload" directly relates to the unit mission, it does influence the individual personnel requirements of the force.

Physician requirements in "above the line" forces do not directly depend on workload, such as casualty rates, but on the existence of their organic unit. The units are subject to large variances in combat intensity and casualty rates that affect medical workloads. These variances affect other personnel requirements similarly.

The Army determines wartime unit physician requirements, other than those Table of Distribution and Allowances (TDA) units in CONUS, through the TOE development process and the manpower requirements criteria (MARC) study process. The latter provides the rationale, staffing, and approval for personnel requirements. The total structure-based physician requirement is the sum of the products of the number of physicians in each unit and the number of each unit allocated to the force. Decisions concerning which units are active component and which can be reserve component will further influence the number of physician requirements in the Active Army, the Army National Guard, and the U.S. Army Reserve. The identification of physician requirements for combat health service support functions at level 1 and 2 are no exception to this rule in allocating Army forces.

The MARC study process determines the qualitative (skills or MOS) and quantitative (number) of personnel required to perform a combat support or combat service support function within types of organizations or units. The MARC is the Army's recognized method of standardizing the requirements determination process for personnel required to perform selected functions in the theater. The objective of MARC studies is to produce a criterion that expresses the quantitative and qualitative wartime personnel requirements needed for the performance of a defined function in a theater of operations, at varying levels of a work activity or service provided. The approved criterion is a standard on which the Army can base a judgment decision. MARC developers are responsible for producing studies that provide a complete explanation of the work function, skills involved, and the methodology employed to establish the proposed criterion. The effect upon TOE and force structure is an integral part of each MARC study document. MARC studies address supervisor and staff function requirements as well as worker position requirements. Proponents, such as the Infantry School, the Armor School, and the AMEDD Center and School, review MARC annually to assure that they are current. They send the results of their review to the Training and Doctrine Command (TRADOC) for approval. The following list highlights some of the areas that may indicate a requirement to change or update the MARC.

1. Unit mission changes.
2. Doctrinal changes.
3. Equipment changes.
4. Performance or policy changes for functions.

The AMEDD Center and School has an excellent record and reputation, throughout the TRADOC system, for accomplishing quality MARC studies.

Although this study made recommendations for potential adjustments to Medical Corps (MC) requirements at level 1 and 2 in division areas of responsibility, these recommendations should go through the MARC study process as the prerequisite to implementing any TOE changes throughout the Army.

2.3 Current Staffing Standards

The basic element of the level 1 and 2 medical system is the treatment squad. The treatment squad is one of six division level medical modules and is the medical treatment element of the battalion aid station. In Force XXI, the squad is organic to the Forward Support Company of the Forward Support Battalion. The companies are normally employed in support of a maneuver battalion. There are also treatment squads in designated combat support units and medical companies or detachments of separate brigades, divisions, and echelons above division units. It provides sick call, triage, advanced trauma management, and tailgate medicine. The squad can operate as two treatment teams for support of tactical "split operations." The commander can employ separate teams where organic medical requirements dictate requirements for more than an aidmen but less than a full squad. The standard staff configuration consists of a senior treater (team leader) that is either a field surgeon or physician's assistant (PA). If the unit involves aviation, a flight surgeon replaces the physician or PA. The other three members of a medical treatment team include a 91B EMT NCO and two 91B Medical Specialists. In December 1993, the AMEDD Technical Committee directed that stand alone teams have a PA as the senior treater, unless the law requires a flight surgeon. The references for this are: MARC study document (MSD) for treatment squad / team function, AOC 62B/65D, and MOS 91B, and MARC review document (MRD) for treatment squad / team, AOCs 62B, 65D, MOS 91B.

SECTION 3. SUMMARY OF PHYSICIAN REQUIREMENTS AT LEVEL 1 AND 2 -- PAST AND PRESENT

3.1 Overview

The contractor conducted a literature search, reviewed records, interviewed former medical unit commanders, and reviewed responses to a questionnaire provided to the subject matter expert panel. This was a fast, but thorough, historical review of the employment of medical corps officers at levels 1 and 2. Clearly, there was not a single source, and **both the quality and quantity of published information decreased dramatically from World War II to the present.** Tables of Organization and Equipment for levels 1 & 2 helped to determine the number of Medical Corps officers required. Contractors used TOE, rather than MTOE, because of the many undocumented variances in the latter. The contractor studied casualty rates using these references: FM 101-10-1/2 (Volume 2) and FM 8-55.

Although beyond the scope of this study, it is important to note that echelonment of medical care on the battlefield and beyond was the inspiration of Surgeon Jonathan Letterman during the Civil War. The structure he employed then has evolved through two World Wars and the Korean and Vietnam conflicts. That philosophy and echelon structure remain relatively constant and represent what the United States Army goes to war with today.

3.1.1 World War II

LEVEL 1:

3 Regimental Medical Detachments @ 6 MC	18
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LEVEL 2:

1 Division HQS @ 2 MC (Div Surg & Medical Inspector)	2
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1 Medical Battalion HQS @ 2 MC	2
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1 Medical Bn Clearing Company @ 10 MC	10
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3 Medical Bn Collecting Companies @ 4 MC	<u>12</u>
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TOTAL	44
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The first medical personnel to reach a casualty were from the Regimental Medical Detachment. Each Detachment had three Battalion Medical Sections. Even though the Detachments were not organic to the combat battalion, they served with the battalion as an *attached* unit. Six other large units, or combinations of units, in the division, also had medical detachments as part of their Tables of Organization and Equipment (TOE). Because the number of these units in the combat force varied, they are not included in the level 1 totals. However, if we did include these physicians, the number of Medical Corps officers in the division would have nearly doubled. Six physicians formed the Medical Corps complement of the detachment. This element became fully operational when the battalion did not make steady forward progress or when the progress was very slow. Otherwise, "tailgate medicine" was the normal operation. Functions of the Regimental Medical Detachment included, sorting of the

wounded, providing emergency treatment or supplementing treatment already given, tagging, and keeping a record of the sick and wounded.

Level 2 included the senior medical officer of the division, the Division Surgeon, who did not command the medical battalion, or any medical unit. This was a staff officer that advised the division commander concerning the health of the command. The medical inspector was a medical officer in the Medical Section of Division Headquarters. The responsibilities of this officer included inspections of the general area and messes, all medical department activities within the jurisdiction of the division, as well as the Venereal Disease Control Officer.

Level 2 medical treatment and evacuation, both direct support and area support, were the missions of the Division Medical Battalion. Two physicians belonged to the battalion headquarters, the commander and his assistant. The three collecting companies of the battalion, each with four medical officers, were the forward echelon of division medical service. In a doctrinal configuration, one company supported each combat regiment. The collecting platoon of the company had the ambulance and litter bearer sections. The functions of the station section were to collect casualties from the Regimental Medical Detachments and then transport them to the division clearing station. Casualties passing through the collecting stations received additional treatment before evacuation to the division clearing station. Casualty sorting, conducted at all levels of medical support, helped assure that as many soldiers as possible returned to their unit. The clearing company, organized with a headquarters and two clearing platoons, had a total of ten medical officers. Normally only one of the two platoons set up while the other platoon remained marginally operational. This tactic enhanced the rapid forward movement of one platoon, "leap frog," so it could better respond to the number of casualties requiring treatment and the demands of the tactical situation. The emphasis was on mission accomplishment with the minimum of personnel and equipment without sacrificing mobility. The clearing station was the rear-most medical element in the division and it was in the line of evacuation to the hospital (or level 3). Specifically, its functions included sorting all casualties, returning to duty soldiers who were fit for full duty and transferring others, except the dead, to a medical unit at a higher echelon. In all cases where evacuation to the rear was appropriate, they provided the required medical treatment to help assure the casualty could endure the evacuation. This level is not hospitalization.

Medical Administrative Officers (MAC) were commissioned from the ranks of the experienced noncommissioned officers of the Medical Department. They served as adjutants, personnel officers, instructors, mess officers and other specialties. It is important to note, however, that at that time Medical Corps Officers filled positions such as executive officer of the Medical Regiment, plans and training officer and supply officer. When MAC officers took those positions, the number of MCs required decreased in subsequent TOEs.

3.1.2 Korea

LEVEL 1:

3 Medical Companies @ 1 MC (Cdr)	3
3 Medical Platoons per Company @ 1 MC	9
3 Regimental Collection Points @ 2 MC	6

LEVEL 2:

1 Surgeon @ 3 MC (Surg, Med Inspector, Neuropsychiatrist)	3
1 Medical Battalion Hdq (Cdr)	1
1 Clearing Company @ 1 MC (Cdr)	1
3 Clearing Platoons @ 4 MC	<u>12</u>

TOTAL	35
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During WW II, the Army Medical Department grew to unprecedented size and achieved many noteworthy successes. However, after the war there was an immense exodus of physicians, nurses, scientists and medical administrators. In December 1947, of the 3,000 Medical Corps officers allocated in the structure, the Army had only 1,206 spaces filled. Fortunately, a few months prior to this report, Congress took action to help alleviate the physician shortage.

On August 4, 1947, the Medical Service Corps (MSC) organized into six sections: Pharmacy, Supply, Administration, Medical Allied Sciences, Sanitary Engineering, and Optometry. Medical Administrative, Pharmacy, and Sanitary ceased to exist as separate branches. From this point on, MSC officers filled the positions that MC's had held during WW II, such as Assistant Regimental Commander, Plans, Operations and Training Officer, Medical Supply and Pharmacy Officer.

Compared to the medical support for WW II, there were changes in both the structure and number of medical officers for Korea. The Medical Company at level 1, allocated on the basis of 1 per regiment, consisted of 3 Medical Platoons and 1 Collecting Station. Each maneuver battalion had one medical platoon. In combat, the medical platoon was attached to the infantry battalion it supported and was under the command of the maneuver battalion commander. Therefore, the battalion commander became directly responsible for the medical service within his battalion. The regimental surgeon retained technical supervision over the platoon and was a staff officer of the regimental commander.

The battalion aid station (BAS) had 1 MC, and his assistant was an MSC officer. Along with a number of noncommissioned officers and technicians, the BAS provided emergency medical care for the sick and wounded including: patient sorting, preparation for evacuation, arresting hemorrhage, immobilizing fractures, administration of blood and plasma and treatment for shock.

The collecting station's mission was to receive wounded soldiers from the BAS and provide litter bearers and ambulances. The MCs, assisted by MSCs, provided

further emergency treatment, sorted the casualties and returned as many soldiers as possible to duty. The Headquarters, Medical Battalion deleted one medical officer position leaving only one physician. The position of executive officer for the battalion was now a Medical Service Corps Officer. The Clearing Company, with three subordinate Clearing Platoons, had basically the same functions as before but the number of physicians increased from ten to fifteen. The Collecting Companies in the structure for WW II disappeared. This resulted to a reduction of 10 medical officers. Overall, the number of physicians allocated to Levels 1 & 2 went down by eleven.

3.1.3 Vietnam Conflict

LEVEL 1:	
9 Battalion Aid Stations @ 1 MC	9
LEVEL 2:	
1 Medical Battalion Headquarters (Cdr & Div Surg)	1
1 Support Company (Cdr)	1
1 Support Company @ 8 MC	8
3 Medical Companies @ 5 MC	<u>15</u>
TOTAL	34

At level 1, Combat medics were organic to the maneuver battalion medical platoon. They often received assignments at the squad level for patrols. The Battalion Medical Platoon, with one medical officer, was organic to the Headquarters and Headquarters Company of the combat battalion. The combat medics of the medical platoon often served at the squad level for patrols. The mission and functions of the BAS closely paralleled those accomplished by the BAS in Korea.

At level 2, the Division Surgeon's section of the past ceased to exist. The functions of the medical inspection officer and the Neuropsychiatrist transferred to the Medical Platoon of the Headquarters and Support Company. Clearing companies of the Division Medical Battalion often supported separate brigade operations or, in some cases, they would consolidate for larger than brigade size mission support. "Light" Clearing Stations also provided operational support to landing zones and fire support bases. Much of this task organization was the direct result of expected high casualty densities and the near exclusive use of aeromedical evacuation.

In all but two cases, air ambulance detachments with 6 UH-1's each, were under the command and control of the 44th Medical Brigade and later HQ, Medical Command, Vietnam. The 1st Cavalry and 101st Airborne Divisions had organic air ambulance platoons. These consisted of 12 UH-1's each.

Due to the organic nature of the air ambulances to the 1st Cavalry and 101st Airborne Divisions, the clearing platoons of the Division Medical Battalion followed doctrine more closely than other divisions. This did not preclude evacuating seriously

wounded soldiers to a surgical or evacuation hospital if the soldier's condition would not deteriorate significantly during the time for the evacuation.

Referring to the comments by Major General Spurgeon Neel in Section 2.1, page 2-1. General Neel's recommendation, based on a limited test, did not go beyond Vietnam. Although there are a number of reasons for this, the most significant is the near exclusive use of the air ambulance for evacuation from the battle zones. This exclusivity was mainly due to the near total lack of secure ground routes for evacuation and the all important time saved by air ambulances. The major draw back to the use of aeromedical evacuation was that a large number of casualties were over-evacuated -- bypassed one or more levels of medical support, contrary to doctrine. The major reason for this apparent shortcoming was that it did not follow logic to evacuate one seriously wounded soldier (urgent) and leave behind several others with less severe wounds. For example, it did not make sense to fly repeated sorties to a "hot" landing zone or hoist extraction site just to keep casualties separated (triaged) by severity of wounds. Therefore, there was frequently a mix of casualties that resulted in some being delivered to a level of medical care greater than their medical condition required.

Another, yet related reason, was the fact that in some areas, such as Chu Lai, the clearing platoon collocated with a Corps level hospital (surgical or evacuation). This alignment precluded the use of echelons of medical support as described in doctrine.

3.1.4 Recent Contingency Operations

In Grenada, division level health service support was provided for six airborne infantry battalions by organic medical units (level 1). They were augmented with an alpha echelon (2-4 MCs) from the Medical Companies (level 2).

In Panama, division health care (levels 1 and 2) was provided by the Forward Support Medical Company of the Forward Support Battalion. They were augmented by Forward Surgical Teams (level 3) from Corps assets.

In Somalia, a Forward Support Medical Company provided division health care (levels 1 and 2) and area medical support to all units operating outside Mogadishu.

In the Persian Gulf War, medical support at all levels was provided according to Army medical doctrine. This war has not yet been fully documented; it was a war with very few casualties upon which to draw meaningful conclusions. In the 24th Mechanized Infantry Division's "Combat Team Historical Reference Book" there was an annotation that Forward Surgical Teams deployed in the Forward Operating Bases (FOB) and that the 47th Combat Support Hospital was in the Division Support Area.

3.2 Recent TOE Design Developments

The following information includes extracts from TOE documents beginning in 1970 to the present. Additional comments help to explain the changes that have occurred.

ARMOR, INFANTRY, MECHANIZED (AIM) 30 NOV 70

LEVEL 1:	
9 Platoon (BAS) @ 1 MC (PA introduced later)	9
LEVEL 2:	
1 Med Bn (Cdr-Div Surg, Psych, PM, Flight Surg) @ 4 MC	4
1 Support Company (Cdr) @ 1 MC	1
1 Support Company @ 6 MC	6
3 Medical Companies @ 5 MC	<u>15</u>
TOTAL	35

The tasks performed at level 1 (BAS) included emergency first-aid, starting intravenous fluids, preparation for evacuation and, time permitting, completing the emergency medical tag.

HEAVY DIVISION (AOE) 1 APR 84

LEVEL 1:	
9 Medical Platoon (BAS) @ 1 MC	9
LEVEL 2:	
1 Division Medical Operations Center (Div Surg) @ 1 MC	1
1 Medical Section, Co Hq, Combat Aviation Bde @ 2 MC	2
1 Medical Platoon, HHC, Attack Hel Bn (Att-1) @ 2 MC	2
1 Medical Section, HHT Div Cav @ 1 MC	1
1 Medical Company, Main Support Battalion (Cdr) @ 1 MC	1
1 Mental Health Section @ 1 MC	1
1 Preventive Medicine Section @ 1 MC	1
1 Division Support Medical Company @ 1 MC	1
4 Treatment Squads @ 1 MC	4
3 Forward Support Medical Companies (Cdr) @ 1 MC	3
3 Treatment Platoon (Leader and Bn Surg) @ 1 MC	3
3 Treatment Section @ 2 MC	<u>6</u>
TOTAL	35

At level 1 self-aid / buddy aid includes a variety of first aid procedures to alleviate life threatening situations. Individual soldiers use this when the combat lifesaver or a medic is not immediately available.

The Combat Life Saver (CLS) is a non-medical soldier with an additional duty. They are specially trained by correspondence courses that is reinforced by hands on training at the unit level.

The combat medic is the first soldier in the combat health service support chain that has MOS producing medical training.

This TOE introduced modular Combat Health Support to the medical structure in the Division. The design was such that a module could support or reconstitute another like module.

At level 1, the Medical Platoon became organic to Combat and Combat Support units. It had one medical officer who served both as commander of the platoon, as well as the Battalion Surgeon. Immediate life saving measures, such as emergency medical treatment (EMT) and advance trauma management (ATM) helped to stabilize the patient for evacuation. They also assisted in the prevention of disease and non-battle injuries. Finally, they provided routine medical treatment on minor injuries and diseases (to include short term holding) to immediately return soldier to duty.

At level 2 is the Forward Support Medical Company that includes:

- 2 Treatment Squad Modules and 1 Patient Holding Module
- Area Support Treatment Squad (forms the base of the clearing station and provides initial resuscitative treatment). Area Support Squad (provides ancillary support to facilitate initial resuscitative treatment).
- Patient Holding Squad (supports patients expected to return to duty within 72 hours).
- Also at level 2 is the Medical Company, Main Support Battalion.

The capabilities of the organizations at this level are:

- Performs triage, initial resuscitation, stabilization to prepare patients for evacuation.
- Provides consultation service.
- Performs emergency and sustaining dental care and limited preventive dentistry.
- Provides limited medical laboratory and radiology services.
- Provides Combat Stress Control
- Provides preventive medicine and environmental health training, surveillance, inspections, and consultation.
- Provides patient holding for up to 40 patients (heavy division), 20 patients (light division) for up to 72 hours.
- Provides Class VIII resupply and medical maintenance.
- Provides reinforcement or reconstitution of Forward Support Medical Companies.

HEAVY DIVISION (AOE) 1 APR 86

LEVEL 1:

9 Medical Platoons @ 1 MC (Bn Surg) 9

LEVEL 2:

1 Division Medical Operations Center (Div Surg)	1
1 Medical Section, Co Hq, Combat Aviation Brigade @ 2 MC	2
1 Medical Section, HHC Attack Hel Bn (Att-1) @ 2 MC	2
1 Medical Platoon, HHT, Div Cav @ 1 MC	1
1 Medical Company Main Support Battalion (Cdr)	1
1 Mental Health Section @ 1 MC	1
1 Preventive Medicine Section @ 1 MC	1
1 Division Support Medical Company @ 1 MC	1
4 Treatment Squads @ 1 MC	4
3 Forward Support Medical Companies (Cdr) @ 1 MC	3
3 Treatment Platoons (Ldr, also Bde Surg) @ 1 MC	3
6 Treatment Squads @ 1 MC	6

TOTAL 35

Division 86, that preceded this TOE, primarily changed equipment, such as tanks and other fighting vehicles. The new equipment required additional soldiers to operate and maintain it. Some CS and CSS division units had to give up spaces for this effort. It did not affect either the medical support organic to combat and combat support units or level 1 & 2 Health Service Support provided in the Division Area. For functions and capabilities, see Heavy Division 84 above. This is the current structure. Force XXI is the next major upgrade to follow.

MEDICAL CORPS AT LEVEL I & II RECAPITULATION

	WW II	KOREA	RVN	AIM 70	AOE 84	AOE 86
LEVEL 1	18	18	9	9	9	9
LEVEL 2	26	17	25	26	26	26
TOTAL	44	35	34	35	35	35

Except for WW II, the number of Medical Corps officers required at levels 1 & 2 has remained relatively constant. The reduction in MC positions between WWII and Korea occurred as Medical Service Corps officers took over many of the administrative positions held by MC officers during WWII. The other major change occurred between Korea and Vietnam with the creation of the division medical battalion. This left only the one physician forward (assigned to the maneuver battalion for level 1 support); level 2 medical support came from the medical battalion.

3.3 Casualty Rates

The contractor made a comparison of casualty rates using information contained in FM 101-10-1/2 and FM 8-55. The historical rates shown are for divisions only. The review included three theaters from WW II: European (ETO), Central South Pacific (CSP) and Southwest Pacific (SWP). Using a notional division of 20,000 troops permitted the calculation of casualty numbers. The killed in action (KIA) rate relates directly to the WIA rate. From both WWII and Korean War medical and Adjutant General records, the number of KIA is approximately 18% of the number of WIA. Thus to compute the rate of KIA, one multiplies the WIA rate times 18%. For ODS, the contractor determined the WIA and KIA rates directly from theater losses for all Services and the population at risk.

EXAMPLE: 0.18×2.17 (WIA Rate) = 0.39 (KIA Rate)

The table of casualty rates in the division below indicates that there has been a near constant decline in casualty rates from WW II to present.

COMPARISON OF AVERAGE DIVISION AREA CASUALTY RATES						
Rates are number per thousand personnel per day						
	WW II ETO	WW II CSP	WW II SWP	KOREA	VIETNAM	ODS
WIA	2.17	1.77	1.92	.76	.39	.33
KIA	.39	.32	.35	.14	.07	.09
NBI	.43	.25	.54	.55	.14	.04
DIS	1.61	.66	3.79	.78	.55	.08

Figure 2. Comparison of Average Division Area Casualty Rates

Patient diagnosis data for U.S. Army soldiers admitted to Army Hospitals in Saudi Arabia during Operation Desert Storm (ODS) for the period August 1990 to July 1991 came from the Analysis Branch of the Customer Service Division, Patient Administration Systems and Biostatistics Activities (PASBA) Fort Sam Houston, Texas.

PASBA's data source was medical logs maintained by U.S. Army hospitals. However, information was not available from all hospitals because some of the facilities

had returned to their home base before discovery that many such records were missing. Later attempts to obtain the missing records were unsuccessful. Also, there was no information available on U.S. Army soldiers hospitalized in other Services' medical treatment facilities.

The records PASBA received had limited demographic, diagnosis and procedure information. There was no indication in the records of killed or wounded in action. Accordingly, only information pertaining to injury cases (no indication as to battle or non-battle) and diseases were available. An article in the August 7, 1991, edition of the Journal of the American Medical Association entitled, "Another War...and More Lessons for Medicine to Ponder in Aftermath" states that for the 540,000 member U.S. force, 148 soldiers had become killed in action and 458 received wounds.

To calculate the average number of division area casualties multiply the rate from the table above by the notional size of the force (20,000).

EXAMPLE (KIA): $(20,000 / 1000) \times 0.39 = 9$

As expected, the average number of division area casualties declines from WW II to the present, which reflects the corresponding reduction of the casualty rates.

COMPARISON: AVERAGE DAILY NUMBER OF DIVISION AREA CASUALTIES						
NUMBER ADMITTED / TREATED & RELEASED/ TOTAL PER DAY						
	WW II ETO	WW II CSP	WW II SWP	KOREA	VIETNAM	ODS
WIA	44/9/53	35/7/42	38/8/46	15/3/18	8/2/10	7/1/8
KIA	9	6	7	3	1	2
NBI	9/44/53	6/23/29	11/54/65	11/54/65	3/15/18	1/5/6
DIS	32/156/188	13/63/76	76/371/447	16/78/94	11/54/65	2/10/12

Figure 3. Comparison of Average Daily Number of Division Area Casualties

Assumptions: These are the assumptions that the panel used when weighing the alternatives:

Total Army Analysis (TAA) factors result in average casualty rates applied over multi-day periods. These casualty rates are averages over large distances, many units, and long periods of time. This means that they do not reflect "true workloads" that occur periodically over time to selected units and areas of the theater.

That the Army will have state of the art health care & medical technology and that *all medical technology initiatives will be fully funded!*

The panel did not include casualties from other Services, NBC weapons, foreign nationals, contractors, civil service employees, or refugees. Even though the analysis did not include them, we know that these personnel will appear at our door for care. We may even have a legal obligation to civil servants and contractors in the theater.

The Brigade Surgeon is empowered to 'weight' the main tactical effort with physicians. The Brigade Surgeon must have the authority to move MC officers where the mission dictates.

TAA 03 CASUALTY RATES				
RATES: <u>AVERAGE</u> NUMBER PER THOUSAND STRENGTH PER DAY				
	MRCW (peak 30 days)		MRCE (peak 30 days)	
	DIVISION	CORPS	DIVISION	CORPS
WIA	2.35	0.61	1.78	0.59
KIA	0.42	0.11	0.32	0.11
NBI	2.03	1.15	1.48	0.69
DIS	1.59	1.12	2.00	0.95

Figure 4. TAA 03 Casualty Rates

These are the planning rates used in Total Army Analysis 2003 (TAA 03). TAA supports the Planning, Programming, and Budget Execution System (PPBES), which in turn supports the Defense Planning Guidance. For comparison to the historic rates, these are the composite averages for the two major regional contingencies over the peak 30 days in each theater.

The AMEDD Center and School recently reviewed disease and non-battle injury (DNBI) rates. That review will be incorporated into TAA 05, however, the information was not available to the contractor or the panel for this study. Even if DNBI rates go down, the division medical structure is driven more by capability requirements than workload.

3.4 Emerging Force XXI -- Division Level

3.4.1 Force XXI There was unanimity among the combat developments community, the AMEDD Center and School (proponent of the Force XXI medical structure), and the independent panel to base the analysis upon Force XXI.

3.4.2 Basic Tenets of Combat Health Service Support The number and mix of treaters, Medical Corps officers (MCs) and physician's assistants (PAs) supported the basic tenets of combat health service support for a "*force projection army*." Those tenets are:

1. Be there
2. Maintain the health of the command
3. Clear the battlefield of casualties
4. Save lives
5. Provide state of the art medical care
6. Assure early return to duty of the soldier

3.4.3 Combat Multiplier Adhering to these tenets assures the important view that the medical force is a "combat multiplier" that directly affects the morale and the will to fight of our soldiers. They know that if they survive a wound, medical personnel will take every action possible to recover, resuscitate, and make them well, if possible. That assurance gives them the confidence to be better soldiers!

3.4.4 Medical Corps Officers in Force XXI The structure of 33 Medical Corps officers proposed under the force XXI concept covers medical contingencies across the spectrum of conflict.

3.4.4.1 The Division Surgeon It starts with the Division Surgeon section under the staff supervision of the Assistant Chief of Staff, Personnel (G1). It consists of a Division Surgeon who is a Medical Corps (MC) officer, Lieutenant Colonel (LTC), Area of Concentration (AOC 60A), and a special staff officer. The surgeon is responsible for technical control of all medical activities in the command. The surgeon has responsibility for the overall planning of health service support in both peace and war. Some of these duties include:

- Health of the command
- Combat health support operations
- Preventive medicine
- Combat stress control
- Medical evacuation
- Dental treatment
- Medical training

Medical logistics
Status of wounded
Disease and non-battle injury (DNBI) casualties

3.4.4.2 The Division Surgeon Section The second Medical Corps officer assigned to the Division Surgeon's section is the Preventive Medicine officer (MAJ, AOC 60C) who is responsible for implementing the command preventive medicine program. This individual serves as the principal advisor concerning medical threats that might affect the division. The PM officer recommends preventive medicine measures to minimize these threats wherever the division will operate. The duties of a PM officer include:

Assuring command awareness of potential medical threats.
Monitoring the immunization and chemoprophylaxis status of division personnel.
Monitoring the status of individual and unit preventive medicine measures.
Monitoring preventive medicine measures against heat and cold injuries and food-, water-, and vector-borne diseases.
Disease and injury surveillance.

These two medical staff officers generally work in the division support area (DSA). They are collocated with the Main Support Medical Company (MSMC).

3.4.5 Division Support Medical Company (DSMC) The main support medical company has five Medical Corps officers authorized. One of these officers is a Psychiatrist (AOC 60W) who monitors the mental health of the command. This includes management of the combat stress control program. The primary goal is to assist commanders in controlling combat stress through sound prevention programs. The overall responsibilities include establishing policy and guidance for the prevention, diagnosis, management and return to duty of combat stress reaction casualties.

3.4.5.1 Additional Officers in DSMC There are four additional Medical Corps officers (AOC 62B, Field Surgeon) assigned to the Main Support Medical Company. They help to perform the mission of the unit, which is to provide levels 1 and 2 combat health support to units operating in the division support area (DSA). It can reinforce or reconstitute supported forward support medical company (FSMC) elements. The four positions that the medical corps officers occupy are:

Medical company commander: senior field surgeon.
Physician in each of the two treatment squads of the treatment platoon.
Physician in the area treatment squad of the area support squad.

The five medical corps officers provide excellent combat health coverage in the division support area.

3.4.5.2 Treatment Squads The treatment squads each contain two teams. The teams form the cornerstone of the division modular combat medical support. The squads contain both a physician and a physician's assistant as the team leaders with a medical non-commissioned officer, medical specialist and a driver / radio telephone operator on each team. They work either as a treatment squad or as individual teams providing tailgate medicine in forward locations. This simultaneous tactical split-based treatment capability provides tremendous versatility and allows Medical Corps officers (MCs) to go far forward and augment the existing battalion aid station, combat medic, combat lifesaver, and self aid or buddy aid programs already in place.

3.4.6 Brigade Surgeon In each brigade (1 armor, 2 mechanized, 1 aviation) there is a brigade surgeon. In the maneuver brigades (armor and mechanized), the brigade surgeon is a MAJ, AOC 62B, Field Surgeon. In the aviation brigade, the brigade surgeon is a MAJ, AOC 61N, Flight Surgeon. All brigade surgeons are special staff officers who work with and coordinate brigade command health services with the S-1. They are responsible for the technical control of all medical activities in the brigade area of operations. It is important that the Brigade Surgeon is empowered to "weight" the main battle effort with physicians.

3.4.7 Forward Support Medical Company The forward support medical companies (FSMC), located in the brigade support area (BSA) of the three (3) maneuver brigades provide levels 1 and 2 combat health support to units operating in the brigade support area. They can reinforce or reconstitute forward support companies (FSC) in the maneuver battalion areas. They are an integral component of the forward support battalion that has command and control over both the FSMC and the three (3) FSCs.

3.4.8 Forward Support Battalion There are six physicians assigned to the forward support battalion. They are normally assigned as follows:

Three (3) Physicians (AOC 62B Field Surgeons) to the FSMC:

One (1) serves as the FSMC commander. That MC is a working physician / surgeon and the executor of the combat health support plan.

One (1) serves in the treatment section as a treatment team leader.

One (1) serves in the area support section as the area support treatment squad leader.

The other three physicians (AOC 62B Field Surgeon) normally work in the maneuver battalions as both the maneuver battalion surgeon and the officer in charge of a treatment team. This gives the maneuver battalion three treatment teams per battalion. The other team leaders are physician's assistants.

The total is eighteen (18) physicians assigned six (6) each to the three forward support battalions within the division.

3.4.9 Battalion Surgeons The final four physicians assigned to the division are four (4) battalion level surgeons (AOC 61N Flight Surgeon). Three (3) are battalion surgeons in the aviation battalions and one is the battalion surgeon in the armored cavalry squadron. All four serve as the medical officer in charge of the combat health service support for their organization. They also serve as the medical planner, preventive medicine officer and other duties associated with the only medical corps officer within an organization.

3.4.10 Summary This describes the duties and responsibilities of the medical corps officers in a heavy division. The light division differs primarily in the tempo of its operations, the missions assigned, and the environment and terrain in which it operates. The medical structure supporting this division is almost identical, except for the transport and weapons systems. Having this structure allows the AMEDD to "conserve the fighting strength" and to provide our most precious asset, the American soldiers, with the combat health care support they deserve. **Joint Vision 2010 says "The American people will continue to expect us to win any engagement, but they also expect us to be more efficient in protecting lives and resources while accomplishing the mission successfully!"**

SECTION 4. ANALYSIS

4.1 General

4.1.1 Support Modalities for Level 1 and 2 Structure The division medical support elements that are the focus of this analysis effort are unique in several respects. To adequately comprehend, assess, and assimilate the wealth of information and insights provided by the expert panel regarding this essential component of the level 1 and 2 combat health service support system, the analysis must attempt to capture and highlight that uniqueness. It relates to the fundamental reason why there cannot be the classic application of "workload rules," as with the area support units, to this segment of the combat health service support structure.

In addressing the level 1 and 2 medical support there are two distinct types of medical units. There are those with an area support mission. These are mainly echelons above division units that serve a broad area by providing service to soldiers in non division units beginning at the forward line of troops (FLOT) to the theater rear boundary. Then there are those in direct support (medical units or elements organic to divisions, separate brigades, and armored cavalry regiments, plus some other combat support units). There is an important difference between the two. The design and size of most area support units meets a specific and measurable workload (usually hospitalized patients or troop populations). Their allocation to the force derives from that workload. An example is the area support medical battalion. The organic or direct support medical units, however, are capability based. They are an integral part of their organization and its mission. The unit is *their* patient (or customer) and their unit mission is theirs also. They exist to help their unit to accomplish its combat mission and they are a "first order" combat multiplier for their unit.

4.1.2 The Division -- A Capabilities Based Force The design (organization, staff, and equipment) of medical elements organic to divisions, brigades and battalions is not solely dependent upon workload driven requirements. Like the units to which they belong, their design provides a capability. That capability will always be required, will seldom be taxed, will sometimes be stressed, and may occasionally be overwhelmed.

Although medical units do not go into reserve, reinforcement of other medical elements that risk overwhelming workloads is part of doctrine and practice. Casualty spikes (concentrations) normally occur at points and times associated with the main effort, enemy or friendly, rather than evenly spread across the entire front. Other medical resources may undergo temporary reduction where lighter workloads may occur, to include EAD units. These resources move to compensate for temporary overloads of patients in the stressed area. Reconstitution of lost medical units or elements occurs similarly through shifting of other assets. These moves, however, are typically for longer duration and depend upon theater replacements. The most familiar analogy would be the community investment in a fire department. If it were possible to consolidate and dispatch from a central location and precisely predict the time and

place of each fire, accident, or hazardous cargo spill, the community could provide resources on a workload rather than a capability model. As mentioned earlier, the typical fire department's capability will always be required, will seldom be taxed, will sometimes be stressed, and may occasionally be overwhelmed. Like the design for the fire department, organic level 1 and 2 medical organizations do not receive enough structure for a 100% solution to the worst case, or peak workload. Likewise, they cannot receive only the structure needed for the routine or average workload.

Using the fire department example, a routine workload (if workload is fires, accidents, and spills) conceivably might result in a one truck and one crew solution for a city. The fire department engages in community fire prevention programs, training, and public relations with the personnel resources in its capability based structure. The organic medical units routinely engage in preventive medicine and health promotion among their fellow unit members. They assist in the operational planning for the unit's mission and in the training and sustinment of medical skills to enlisted medical and non-medical soldiers in their units. This includes self aid--buddy aid, combat life savers, **wellness**, unit sanitation, and more. Their contribution is continuous and ranges from training and prevention to triage and advanced trauma life support (ATLS) of mass casualty producing operations -- the other end of the spectrum. If workload were defined exclusively by the casualty rates, then the structure (physician and others) will not be justified when operations are at the low end of the spectrum. Likewise, the structure will not be adequate if measured at the high end of the spectrum. However, if capability is the measure, the design and organization staffing is "about right!"

The former Vice Chief of Staff of the Army, General Maxwell Thurman, said: "the target is to get to the 80% solution." Capability based design of organizations is as much an art as it is a science.

4.1.3 A Changing Environment There is always reason to review the investment required for a capability based structure. Technology, communication improvements, doctrinal changes, and demographics may all have an effect and they require adjustments to the structure to retain the necessary capability. Sometimes the capability itself may require adjustment. This analysis considered those factors. This has been an effort to revalidate and redefine the 80% solution.

More highly trained medics, supported with technology, increases the workload because more patients will survive to require care. The medical force is a "combat multiplier;" it directly influences soldiers morale and their will to fight.

Medical units must be able to support the combat unit during split operations, task force operations, night operations, long distance-high mobility operations, under any conditions of enemy action, weather, terrain, and troop preparation. They must be capable of occasional operations spanning more than 24 hours and often with few stops.

Several years ago, the AMEDD C&S conducted an analysis of the San Antonio Fire Department for 30 days. The "average" workload that they supported indicated that they could support the entire city for fires, accidents, hazardous spills, and calamities with just a handful of trucks and crews (centrally located). San Antonio is over 50 miles wide in most directions. Fortunately the city does not staff the fire department on workload, but on the capability they offer.

4.1.4 Options and Risks

4.1.4.1 Focus of the Analysis The recently developed Force XXI medical package was the focus of this analysis. The AMEDD Center and School decided, and the panel agreed, that Force XXI should be the subject of the analysis, because it represented the Army's plan and objective to meet the military strategy. Although there was discussion of some echelon above division (EAD) medical units, the panel and the AMEDD Center and School determined that there was nothing to gain from extending the analysis to those units. The medical reengineering initiative (MRI) concept received approval from the Army Vice Chief of Staff on October 9, 1996. The panel, however, concluded that the medical department would be wise to look again at the utility of selected units before fielding these units in the force.

4.1.4.2 Alternatives The panel identified four alternatives to structuring the Medical Corps (MC) officer requirements in levels 1 and 2 division units:

(a). **Alternative 1**, the most drastic, would reduce total physician requirements by 9 MCs (2 MCs from the DSMC, 1 MC from the Aviation Brigade Surgeon, and 6 MCs from the Forward Support Battalion (2 per battalion)). This alternative removes two physicians from the five assigned to the Division Medical Support Company (DSMC) located in the division support area. This will markedly reduce the ability to perform levels 1 and 2 care in the division support area. It also decrements the reinforcement and reconstitution capability for the brigade support area should those become necessary. Additionally, it removes the brigade surgeon from the aviation brigade. This eliminates the dedicated medical planner from the brigade headquarters and places that responsibility with one of the battalion surgeons. This will reduce the time available to render levels 1 and 2 care in their unit. By removing two of the seven physicians from each of the three forward support battalion's area of operations the ability to render levels 1 and 2 care is severely decremented. Also, they lose the ability to reinforce or reconstitute organic medical support in maneuver battalions, when needed. There would be a detrimental effect upon troop morale if they feel that they are not going to receive high quality medical care quickly. Because of the greater dispersion between Medical Corps officers, casualties will experience longer delays before seeing a physician, thus increasing their

chance of increased morbidity and mortality. **There is a 29% reduction in MC assets in the brigade area causing a marked reduction in medical capability throughout the brigade area of operations!** This represents a 27 percent reduction in MC assets in the division.

- (b). **Alternative 2** represents a less drastic reduction than Alternative 1, above. It reduces total MC structure by 6 (2 from the DSMC, 1 aviation brigade surgeon, and 3 from the forward support battalions -- 1 per battalion). This alternative leaves the exact problems articulated in alternative 1 in the DSMC and the aviation brigade. There will be a degradation of services in each. The reduction of only one physician in the forward support battalion allows the commander more flexibility to provide the three maneuver battalions with a physician as a treatment team leader. It also leaves two physicians in the FSMC to simultaneously fulfill the mission of area medical support. This added capability does enhance medical support to combat troops; but it also retains some of the previously mentioned limitations. There would still be a detrimental effect upon troop morale if they feel that they are not going to receive high quality medical care. Because of the dispersion between Medical Corps officers, casualties will experience longer delays before seeing a physician, thus increasing their chance of increased morbidity and mortality.
- (c). **Alternative 3** reduces physician requirements by 3 MCs (2 from the DSMC, and one from the aviation brigade -- the brigade surgeon). This alternative is less risky, because corps physician assets could reconstitute or reinforce the 2 DSMC (2 of 5) should the situation demand this course of action. Please note that the allocation of corps level physicians depends upon a population supported workload criterion. Therefore, if corps assets reconstitute a division, there will be a decrement in corps level care capability. There is no doubt that the more critical mission is in the division support area and the medical planner would shift assets, should the situation arise. One of the aviation battalion surgeons would perform the duties of the aviation brigade surgeon (staff planning). This alternative is less risky than the previous two alternatives!
- (d). **Alternative 4** is to make no changes to the Force XXI MC structure in the division. The total would remain at 33 physicians (two physicians less than the current structure) to provide the necessary and required level of medical support to the division.

The Army will test a proposed reduction of 2 physician requirements in Force XXI from the present 35 MCs. The total MC requirements will be **33**. This is a minimal risk force with high combat effectiveness. According to the panel: **"Alternative 4 represents the minimum**

physician requirements for supporting a division in any theater of operations!"

The benefits analysis of this alternative shows that the 33 MCs support the entire spectrum of combat health service support required for Force XXI. There is sufficient capability built in to assure full reconstitution and reinforcement for medical coverage.

Other factors are that it allows division medical planners the capability to support split combat operations. It enhances the ability to task organize medical support to fit combat operations at all levels. And it enhances the tactical commander's ability to fight and win. Soldiers fight better when they know they will be cared for, if and when injured.

4.1.5 Workload Assessment -- Patient Model

The AMEDD Center and School has developed a database for levels 1 & 2, using the same time, task, treater file format as the Deployable Medical Systems (DEPMEDS) database, for 350 patient conditions. It computes levels 1 & 2 direct patient care workloads. It operates with the Patient Generator (PATGEN) and the Global Requirements Estimator for Wartime Medical Support (GREWMS), an approved Army model. The limitation of these models is the artificiality of averaging patient event occurrences evenly across force dispersion and time. In WWII five divisions might have covered a 50 mile front. Today, a battalion may operate 50 miles from its supporting brigade and much farther from the remainder of the division.

Workload models for levels 1 and 2 depend on very small amounts of real data concerning this level of care. Most of the data is anecdotal. Consequently, the simulation modelers depend upon expert panels to describe the type and amount of work, the numbers and types of patients seen, the tasks, treaters and times to perform the medical support, and any supplies or equipment needed. Remember: these models use patient data that is averaged over time (months) and distance (5+ divisions and hundreds of miles). Battles are not fought in that fashion. They are quick, intense, and localized. They occur in all sorts of terrain, climate, and surprise.

4.1.5.1 Background Although the structure of the organic levels 1 and 2 medical units is not exclusively driven by casualty workload, there is tremendous utility in the development of a level 1 and 2 patient data base. It would complement the Services levels 3 and 4 data base (commonly known as the "DEPMEDS Data Base"). Such an effort started in 1995 and continues today at the AMEDD Center and School. This analysis is one of the first applications to use that data base. The design of the original data base was for levels 3 and 4. They added task, time, treater information to levels 1 and 2 for the same patient conditions (PC) used in the level 3 and 4 database. They added some PCs that are common at levels 1 and 2, but do not normally reach level 3. These patients return to duty (RTD) at level 1 or 2, therefore, they were not part of the

DEPMEDS Data Base. The level 1 and 2 data base has matured faster due to the experience gained during the development of the DEPMEDS Data Base. Many experienced providers at levels 1 and 2 have reviewed this data, but it has not had the same degree of scrutiny as the DEPMEDS level 3 and 4 data base. It is, however, the most accurate tool available for analyzing workloads at levels 1 and 2. This analysis used workload obtained from this database and the two TAA 03 theaters.

4.1.5.2 Summary of Casualty Workloads Summary of casualty workloads at levels 1 and 2: The focus of the modeling was to determine the hours of "hands on care" required by physicians at levels 1 and 2. This analysis of casualty workloads did not address the second tenet of combat health service support: maintain the health of the command. This is an activity that has no easily measured tasks associated with the population supported. It involves preventive medicine, combat stress surveillance, medical support planning, and many other functions.

Another purpose was to determine if there were any particular tasks that required physician intervention or that the physician assistant was not skilled or authorized to provide. The finding was that no tasks performed at levels 1 and 2 exclusively required a physician. All were within the capability of a **properly supervised and supported** physician assistant (PA). However, the levels 1 and 2 data base assigns tasks to specific treaters for determining the workload. Even if PAs could substitute for a physician, there still must be a physician nearby to provide the supervision. Consequently treatment squads consist of one physician led team and one physician assistant led team. The following analysis considers only the physician portion of the workload.

These results were consistent with the panel conclusions. The daily work hours directly attributable to "hands on care" of the wounded, sick, and injured by the physicians (in a Force XXI heavy division) are as follows:

4.1.5.2.1 Alternative 1: There is a total of 24 MC officers. The analysis considered all MC, including dedicated staff MC (Div Surg, Bde Surg) and the PM officer. The result is an average (see 4.1.5.2.5 below) workload of 10.3 daily hours per MC for the Major Regional Contingency East (MRCE) and 10.0 daily hours per MC for the Major Regional Contingency West (MRCW).

4.1.5.2.2 Alternative 2 There is a total of 27 MC officers. The analysis considered all MC, including dedicated staff MC (Div Surg, Bde Surg) and the PM officer. The result is an average (see 4.1.5.2.5 below) workload of 8.9 daily hours per MC for MRCE and 8.6 daily hours per MC for MRCW.

4.1.5.2.3 Alternative 3 There is a total of 30 MC officers. The analysis considered all MC, including dedicated staff MC (Div Surg, Bde Surg) and the PM officer. The result is an average (see 4.1.5.2.5 below) workload of 7.8 daily hours per MC for MRCE and 7.6 daily hours per MC for MRCW.

4.1.5.2.4 Alternative 4 There is a total of 33 MC officers. The analysis considered all MC, including dedicated staff MC (Div Surg, Avn Bde Surg, Bde Surg) and the PM officer. The result is an average (see 4.1.5.2.5 below) workload of 7.2 daily hours per MC for MRCE and 7.0 daily hours per MC for MRCW.

Comparison of Alternatives				
Alternatives >	1	2	3	4
Number of MC Positions Removed (-) / Number Remaining				
Aviation Bde	-1 / 3	-1 / 3	-1 / 3	0 / 4
DSMC	-2 / 3	-2 / 3	-2 / 3	0 / 5
3 FSBs	-6 / 12	-3 / 15	0 / 18	0 / 18
Others	6	6	6	6
Total	24	27	30	33

Figure 5. Comparison of Alternatives

4.1.5.2.5 Caveat Concerning Average Workloads For the above alternatives, the workloads were averages over the entire theater of operations and over 30 day or longer duration. The casualty rates from peak periods were smoothed (flattened) and averaged over time and across a division front. They represent the average casualty care workload in work hours per day per treator in the division area. The method assumes equal distribution of casualties and medical providers across both time and space. Although the method of casualty distribution is grossly artificial and is not a reasonable prediction of workload for medical operations at division level, it provides some insight into the types of casualties and types of skills required. The MARC process allows 12 hours per MC officer per day. The remaining time is required for rest, personal time, eating, and other duties performed in the unit. "On average" they are working 50% to 80% of their time on direct patient care. In reality, they may be extremely busy and then idle. Although workload justifies the requirement "on average", MCs must provide the capability to support the unit at all times.

4.1.5.2.6 Effects of Technology Insertion The panel and the contractor both considered the effects of technology insertions upon the medical force. One aspect of that is the slight increase in workload resulting from the ability to save more lives by early intervention to stop hemorrhage with trained personnel and special bandaging. A complete discussion of this is found at Appendix B.

SECTION 5. RECOMMENDATIONS

5.1 General

5.1.1 Background Historically, the army medical department has sized its physician strength to respond to the division needs in a combat environment, and to provide the care required to sustain divisional forces engaged in combat. Organizational changes which have been implemented within the division were done to parallel changes in the division structure. Yet, throughout these processes, the medical department remained committed to provide the most comprehensive and the most effective care to combat forces. Its design efforts were undertaken to provide the minimum risk physician force to meet all contingencies. The medical department also endeavored to structure its physician needs based upon the latest advances or technological breakthroughs available. We have seen the introduction of physician assistants as a significant complement for meeting needs. If physician assistants had not been introduced into the force structure, additional medical corps officers would have been required to support levels 1 and 2 care facilities. Their introduction cannot, nor should it, suggest that physician assistants can replace the physician in the total delivery of care to soldiers on the battlefield.

5.2 Recommendation for Physicians Required in the Division The panel unanimously adopted Alternative 4. The AMEDD Center and School concurred with that selection. After rigorous review of history, examination of combat and medical doctrine, and analysis of the workloads for Medical Corps officers, the contractor believes that Alternative 4 is the best course of action.

5.3 Additional Considerations Several underlying issues have been identified. Although not critical, they should be studied to formulate a medical department position on sizing and training its physician force.

5.3.1 Medical Reengineering Initiative (MRI) The panel was aware that the Army Vice Chief of Staff approved the medical reengineering initiative (MRI) concept on October 9, 1996, and elected to table any issues arising from the MRI. The panel did suggest that the AMEDD review the MRI concept once more, prior to actual fielding.

5.3.2 Levels 1 and 2 Time-Task-Treater Data Base The extension of the DEPMEDS data base to the levels 1 and 2 environment should continue with priority. The data will help to revalidate MARCs, medical equipment set (MES) composition, and conduct TOE reviews. The information could refine the casualty generation at the Joint Readiness Training Center (JRTC) and the National Training Center (NTC). It could also refine the workloads for levels 1 and 2 medical unit training. The information could also be a tool that staff surgeons use to educate battalion and brigade commanders and staff. The product is much more pertinent to their activity than the data for levels 3 and 4.

5.3.3 Review Any "Approved" Changes Through the MARC Process The subject matter expert (SME) panel recommended that following any decision concerning this report, the results of the panel should serve as a catalyst to review the MARC for the levels 1 and 2 combat health service support system. The MARC will receive approval required by AR 570-2 before making any changes to requirements documents.

5.3.4 Combat Medic Training The panel expressed concern and suggested an internal review to determine if the 91B advanced individual training (AIT) is producing the necessary skills for the combat medic. The prime customers (officers and NCOs) of the levels 1 and 2 system are clearly concerned that the school is not producing the required product.

5.3.5 Graduate Medical Education (GME) Graduate Medical Education programs (also known as residency programs) which support the specialties associated with levels 1 and 2 combat health service support need an increased and improved focus on operational field medicine. The prime AOC (Area of Concentration) of the levels 1 and 2 system is the 62B, Field Surgeon. The AOC is a position identifier rather than one held by individuals. Typically physicians who have not yet been selected for a residency program are the only individuals who hold 62B as their primary skill identifier. There are several individual AOC which are designated as appropriate to fill a 62B position. Internal Medicine, Family Practice, Emergency Medicine are a few. The panel recommended the GME programs which produce the feeder AOC for 62B positions, such as 61H, Family Physician; 62A, Emergency Physician; 61F, Internist and others, be supplemented to recognize the substantial operational medicine responsibility which is associated with the residency program and the subsequent award of the AOC.

5.3.6 Area Support Medical Detachment The physician structure issue does not improve or worsen because of the existence of the Area Support Medical Detachment (for use at ports of entry). The panel recommended deleting the requirement from the medical reengineering initiative (MRI). Although the organization has physicians, there are no savings since the allocation of these detachments should offset a similar capability normally provided by the area support medical battalion (ASMB). The number allocated to the active component, as opposed to the reserve components, is also questionable. The ASMB basis of allocation (allocation rule) includes the same supported population as the detachment targets. Task organization and operational scheduling of elements of the ASMB into the theater will serve the Army better than an additional organization with limited utility. Other benefits include eliminating an SRC to maintain and sustain for TOE review/BOIP application/MARC.

5.3.7 Physician Assistant Flight Medical Specialist Recommend that the AMEDD Center and School review the Aviation Flight Medicine MARC to determine if the PA Flight Medical Specialist can replace any MC positions.

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APPENDIX A

PANEL MEMBERSHIP

APPENDIX A: PANEL MEMBERSHIP

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APPENDIX B

ASSESS THE EFFECT OF FUTURE TECHNOLOGY INSERTIONS UPON PHYSICIAN REQUIREMENTS

APPENDIX B

Task: Assess the Effect of Future Technology Insertions Upon Physician Requirements. Quantitative analysis of this task has two parts:¹

- a. Additional workload for physicians due to using improved diagnostic equipment and the automation of tasks.
 - For most spheres of medical practice, technology insertions have resulted in improved outcomes for patients, but with an increased cost in training and workload for physicians for each patient treated. The effect upon workload is not easily modeled.
- b. Additional workload at levels 1 and 2 arising from the fact that technology insertions will result in saving potentially salvageable KIA casualties.
 - Technology innovations, such as devices to rapidly identify casualty occurrences and hemostatic bandages to improve hemorrhage control, will decrease the KIA rate and increase the corresponding WIA rate.

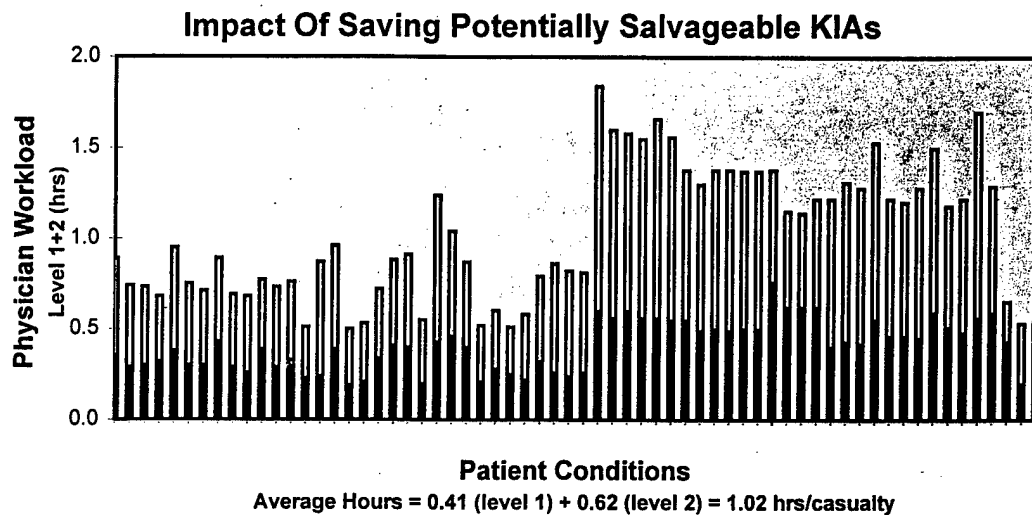
This analysis addresses part "b." (above): the assessment of the future technology insertions upon saving KIA casualties.

Methodology

Assumption: Potentially salvageable KIA casualties are saved by the introduction of new technologies.

Step 1. Determine the additional workload for each casualty now assumed to be saved. These potentially salvageable KIA casualties who are now WIA patients are the more seriously injured casualties. Therefore, it is important to use a representative sample of Patient Conditions (PCs) from the level 1-2 database that are more seriously injured to conduct the workload analysis. In order to do this, PCs were selected in which deaths occurred at levels 1 or 2. This produced a list of 64 PCs out of the 350 in the database. The workload for each of these PCs was then determined. The figure below illustrates the range of physician workload times for these PCs. The average workload for these PCs was determined. The values determined were 0.41 hours/casualty at level 1 and 0.62 hours/casualty at level 2, to give a total workload within the division of 1.02 hours/casualty.

¹ This Appendix prepared by LTC David C. Hutton, Royal Australian Army Medical Corps



Step 2. Identify the KIA casualties for MRC (E) and MRC (W). The table below shows estimates of KIA numbers for the peak 30 days of each conflict.

	MRC (E)	MRC (W)	Average
KIA/theater/day	64.0	72.7	68.4
KIA/division/day	12.1	13.7	12.9

Step 3. Using estimates of the proportion of KIAs who are potentially salvageable, calculate the additional average physician workload for each division. A range was used because there are various estimates of the proportion of KIAs who are potentially salvageable.

Proportion Of KIAs Who Are Salvageable	Average Additional Physician Workload Per Division (hours)
15% ²	2.0
20%	2.6
25%	3.3

Conclusion This analysis concludes that at least 2.0 hours³ of additional clinical work for physicians would occur in each division if we save potentially salvageable KIA casualties by introducing new technologies. This is a 1% increase in clinical workload.

² This more conservative estimate is based upon casualties with uncontrolled limb hemorrhage. Dr Bellamy provided this value during the panel discussions. Many estimates of salvageable KIA are higher.

³ Uses the more conservative estimate of 15% of KIAs being salvageable.

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